

CLAIMS

1. A method for mobile communication carried out among a plurality of mobile stations and a network, personal identifiers being previously and respectively assigned to the mobile stations, the method comprising the steps of:
- 5 assigning temporary identifiers respectively to mobile stations which are communicable with the network;
- storing the personal identifiers and the temporary identifiers of the mobile stations by the network;
- 10 storing the personal identifier and the temporary identifier of each mobile station by the mobile station;
- detecting by the network that one of the temporary identifiers stored in itself is different from that stored in the corresponding mobile station; and
- reassigning by the network another temporary identifier to the mobile station of which the former temporary identifier stored in the network is detected to be different from that stored in the corresponding mobile station.
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2. A base station controller communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations under control of a switching center, the controller comprising enciphering means for enciphering transmitted information, which has been received from the switching center and should be transmitted to the mobile station, so as to generate enciphered transmitted information.
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3. A base station controller communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations under control of a switching center, the controller comprising:
- 25 retransmission-control-information-adding means for adding retransmission

control information to enciphered transmitted information which has been previously enciphered by the switching center; and

transmitting means for transmitting the enciphered transmitted information with the retransmission control information to the radio base stations.

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4. A switching center communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations and the base station controller according to claim 2, the switching center comprising enciphering means for enciphering transmitted information, which should be transmitted to the mobile station, so as to generate enciphered transmitted information.

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~~5.~~ A system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the system being characterized in that the base station controller enciphers information, which should be transmitted from the side of the switching center to the side of the mobile station, before transmitting the information to the base station controller.

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20 ~~6.~~ A system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the system being characterized in that the switching center enciphers information, which should be transmitted from the side of the switching center to the side of the mobile station, before distributing the information to the radio base stations.

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~~7.~~ A system for mobile communication including a mobile station which is able to

conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the system comprising layer-2-enciphering-means for enciphering information that should be processed only in one or more layers which are the same as or higher than layer 2 of the OSI reference model.

8. A system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the system comprising:

layer-3-enciphering-means for enciphering information that should be processed only in one or more layers which are the same as or higher than layer 3 of the OSI reference model; and

layer-2-mutual-notifying-means for facilitating notification between layers of different devices corresponding to layer 2 of the OSI reference model about an onset of transmission of enciphered information.

9. A system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the system comprising:

layer-3-enciphering-means for enciphering information that should be processed only in one or more layers which are the same as or higher than layer 3 of the OSI reference model;

retransmission-control-information-adding means, at a layer corresponding to layer 2 of the OSI reference model, for adding retransmission control information to information which has been previously enciphered by the layer-3-enciphering means; and

transmitting means for transmitting the enciphered transmitted information with the retransmission control information to the radio base stations.

10. A method for controlling a base station controller communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations under control of a switching center, the method comprising the step of enciphering transmitted information, which has been received from the switching center and should be transmitted to the mobile station, so as to generate enciphered transmitted information.

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11. A method for controlling a base station controller communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations under control of a switching center, the method comprising the steps of:

adding retransmission control information to enciphered transmitted information which has been previously enciphered by the switching center; and transmitting the enciphered transmitted information with the retransmission control information to the radio base stations.

12. A method for controlling a switching center communicating with a mobile station, which is able to conduct diversity reception, via a plurality of radio base stations and the base station controller according to claim 3, the method comprising the step of enciphering transmitted information, which should be transmitted to the mobile station, so as to generate enciphered transmitted information.

13. A method for controlling a system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the method comprising the step of, at the base station

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controller, enciphering information, which should be transmitted from the side of the switching center to the side of the mobile station, before distributing the information to the radio base stations.

- 5 14. A method for controlling a system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the method comprising the step of, at the switching center, enciphering information, which should be transmitted from the side of the switching center to the side of the mobile station, before distributing the information to the radio base stations.

- 10 15. A method for controlling a system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the method comprising the step of enciphering information that should be processed only in one or more layers which are the same as or higher than layer 2 of the OSI reference model.

- 20 16. A method for controlling a system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the method comprising the steps of:

- 25 enciphering information that should be processed only in one or more layers which are the same as or higher than layer 3 of the OSI reference model; and

facilitating notification between layers of different devices corresponding to layer 2 of the OSI reference model about an onset of transmission of enciphered information.

17. A method for controlling a system for mobile communication including a mobile station which is able to conduct diversity reception, a plurality of radio base stations, and a base station controller communicating via the radio base stations under control of a switching center, the method comprising the steps of:

enciphering information that should be processed only in one or more layers which are the same as or higher than layer 3 of the OSI reference model;

adding retransmission control information at a layer corresponding to layer 2 of the OSI reference model to information which has been previously enciphered by the enciphering step; and

transmitting the enciphered transmitted information with the retransmission control information to the radio base stations.

18. A mobile station communicating with a network over the air, comprising decipherment-onset-time-setting-means for setting a time to start deciphering an enciphered reception signal dependently on a time to start enciphering a transmission signal in the network and independently of a time to start enciphering a transmission signal in the mobile station.

19. A mobile station according to claim 18 further comprising deciphering means for deciphering an enciphered reception signal received from the network over the air, the decipherment-onset-time-setting-means including:

encipherment-onset-request-determining means for determining if a reception encipherment onset request is received from the network or not; and

decipherment-instructing means for instructing the deciphering means to start deciphering in accordance with a time when the reception encipherment onset request has been received on the basis of the determination.

20. A mobile station communicating with a network over the air, comprising encipherment-onset-time-setting-means for setting a time to start enciphering a transmission signal independently of a time to start deciphering an enciphered reception signal.

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21. A mobile station according to claim 20 further comprising:

transmission-encipherment-onset-requesting means for transmitting a transmission encipherment onset request to the network over the air; and

enciphering means for enciphering the transmission signal so as to generate
10 an enciphered transmission signal, the encipherment-onset-time-setting-means including encipherment-instructing means for instructing the enciphering means to start enciphering in accordance with a time when the transmission encipherment onset request has been transmitted.

15 22. A controller in a network communicating with a mobile station over the air, comprising decipherment-onset-time-setting-means for setting a time to start deciphering an enciphered reception signal dependently on a time to start enciphering a transmission signal in the mobile station and independently of a time to start enciphering a transmission signal in the controller.

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23. A controller in a network according to claim 22 further comprising deciphering means for deciphering an enciphered reception signal received from the mobile station over the air, the decipherment-onset-time-setting-means including:

encipherment-onset-request-determining means for determining if a reception
25 encipherment onset request is received from the network or not; and

decipherment-instructing means for instructing the deciphering means to start deciphering in accordance with a time when the reception encipherment onset request has been received on the basis of the determination.

24. A controller in a network communicating with a mobile station over the air, comprising encipherment-onset-time-setting-means for setting a time to start enciphering a transmission signal independently of a time to start deciphering an
5 enciphered reception signal.

25. A controller in a network according to claim 24, further comprising:
transmission-encipherment-onset-requesting means for transmitting a
transmission encipherment onset request to the mobile station over the air; and
10 enciphering means for enciphering the transmission signal so as to generate
an enciphered transmission signal, the encipherment-onset-time-setting-means
including encipherment-instructing means for instructing the enciphering means to
start enciphering in accordance with a time when the transmission encipherment
onset request has been transmitted.

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26. A system for mobile communication comprising a mobile station and a
network communicating with each other over the air,

the network comprising:

encipherment-onset-requesting means for transmitting an encipherment
20 onset request to the mobile station over the air;

first-enciphered-transmission-signal-generating means for enciphering a first
transmission signal which should be transmitted from the network to the mobile
station after the transmission of the encipherment onset request, thereby generating a
first enciphered transmission signal;

25 first-enciphered-transmission-signal-transmitting means for transmitting the
first enciphered transmission signal to the mobile station;

response determining means for determining if an encipher onset response by
the mobile station indicating that the encipherment onset request is acceptable is

received or not; and

first deciphering means for starting to decipher a second enciphered transmission signal from the mobile station on the basis of the determination of the response determining means when the mobile station accepts the encipherment onset request,

the mobile station comprising:

request determining means for determining if the encipherment onset request is received or not;

encipherment-onset-responding means for transmitting the encipherment onset response on the basis of the determination of the request determining means when the encipherment onset request is accepted;

second deciphering means for starting to decipher the first enciphered transmission signal from the network when the encipherment onset request is accepted;

second-enciphered-transmission-signal-generating means for enciphering a second transmission signal which should be transmitted from the mobile station to the network after the transmission of the encipherment onset response, thereby generating a second enciphered transmission signal; and

second-enciphered-transmission-signal-transmitting means for transmitting the second enciphered transmission signal to the network.

27. A method for controlling a mobile station communicating with a network over the air, comprising the step of setting a time to start deciphering an enciphered reception signal dependently on a time to start enciphering a transmission signal in the network and independently of a time to start enciphering a transmission signal in the mobile station.

28. A method for controlling a mobile station according to claim 27, further

comprising the step of deciphering an enciphered reception signal received from the network over the air, the step of setting a time to start deciphering including the steps of determining if a reception encipherment onset request is received from the network or not; and instructing to start the deciphering step in accordance with a time when
5 the reception encipherment onset request has been received on the basis of the determination.

29. A method for controlling a mobile station communicating with a network over the air, comprising the step of setting a time to start enciphering a transmission signal
10 independently of a time to start deciphering an enciphered reception signal.

30. A method for controlling a mobile station according to claim 29, further comprising the steps of transmitting a transmission encipherment onset request to the network over the air; and enciphering the transmission signal so as to generate an
15 enciphered transmission signal, the step of setting a time to start enciphering including the step of instructing to start the enciphering step in accordance with a time when the transmission encipherment onset request has been transmitted.

31. A method for controlling a controller in a network communicating with a
20 mobile station over the air, comprising the step of setting a time to start deciphering an enciphered reception signal dependently on a time to start enciphering a transmission signal in the mobile station and independently of a time to start enciphering a transmission signal in the controller.

32. A method for controlling a controller in a network according to claim 31,
25 further comprising the step of deciphering an enciphered reception signal received from the mobile station over the air, the step of setting a time to start deciphering including the steps of determining if a reception encipherment onset request is

received from the network or not; and instructing to start the deciphering step in accordance with a time when the reception encipherment onset request has been received on the basis of the determination.

5 ~~33.~~ A method for controlling a controller in a network communicating with a mobile station over the air, comprising the step of setting a time to start enciphering a transmission signal independently of a time to start deciphering an enciphered reception signal.

10 34. A method for controlling a controller in a network according to claim 33, further comprising the steps of

transmitting a transmission encipherment onset request to the mobile station over the air; and

15 enciphering the transmission signal so as to generate an enciphered transmission signal, the step of setting a time to start enciphering including the step of instructing to start the enciphering step in accordance with a time when the transmission encipherment onset request has been transmitted.

20 ~~35.~~ A method for controlling a system for mobile communication in which a mobile station and a network communicate with each other over the air, the method comprising the steps of:

transmitting an encipherment onset request from the network to the mobile station over the air;

25 enciphering a first transmission signal which should be transmitted from the network to the mobile station after the transmission of the encipherment onset request, thereby generating a first enciphered transmission signal;

transmitting the first enciphered transmission signal to the mobile station;

determining if an encipher onset response by the mobile station indicating

starting to decipher a second enciphered transmission signal from the mobile station on the basis of the determination of the response determining step when the mobile station accepts the encipherment onset request;

transmitting the encipherment onset response on the basis of the determination of the request determining step when the encipherment onset request is accepted;

enciphering a second transmission signal which should be transmitted from the mobile station to the network after the transmission of the encipherment onset response, thereby generating a second enciphered transmission signal; and

36. A mobile station communicating with a network over the air, comprising
 encipherment-procedure-notifying-means for notifying the network about
 encipherment-procedure-specifying-information specifying one or more possible
 encipherment procedures of the mobile station.

38. A mobile station communicating with a network over the air according to claim 36, comprising encipherment communication means for conducting an

encipherment procedure corresponding to an encipherment request given by the network and for communicating with the network.

39. A mobile station according to claim 38, wherein the encipherment
5 communication means includes enciphering-key-generating-means for generating an
enciphering key corresponding to enciphering-key-generation-procedure-specifying-
means specifying an enciphering key generation procedure notified by the network;
and enciphering means for conducting an encipherment procedure using the
enciphering key generated by the enciphering-key-generating-means.

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40. A controller in a network communicating with a mobile station over the air,
comprising:

encipherment-procedure-selecting means for selecting an encipherment
procedure for communication in accordance with encipherment-procedure-specifying-
15 information, specifying one or more possible encipherment procedures of the mobile
station, notified by the mobile station; and

encipherment requesting means for notifying the mobile station about an
encipherment request requesting the mobile station to conduct an encipherment using
the encipherment procedure selected by the encipherment-procedure-selecting means.

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41. A controller in a network according to claim 40, further comprising:

enciphering-key-generation-procedure-selecting-means for selecting an
enciphering key generation procedure in accordance with enciphering-key-generation-
procedure-specifying-information, specifying one or more possible encipherment
25 procedures of the mobile station, notified by the mobile station; and

enciphering-key-notifying means for notifying the base station about the
enciphering key generation procedure selected by the enciphering-key-generation-
procedure-selecting-means.

42. A method for controlling access links between a mobile station and a network, characterized in that a plurality of branches are established between the network and the mobile station upon a call attempt to or from the mobile station located at a position where the mobile station can communicate using diversity handover, the plurality of branches including a main branch and at least one auxiliary branch for additional use in order that the mobile station may communicate using diversity handover, thereby enabling the mobile station to commence the diversity handover using the plurality of branches.

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43. A method according to claim 42, wherein the branches are formed between the network and the mobile station via a single base station, thereby enabling the mobile station to commence intra-cell diversity handover.

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44. A method according to claim 42, wherein the branches are formed between the network and the mobile station via a plurality of base stations, respectively, thereby enabling the mobile station to commence inter-cell diversity handover.

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45. A method according to claim 42, wherein the mobile station measures the levels of receptions from circumferential base stations, selects candidate zones for the diversity handover on the basis of the measurement, and notifies the network about the candidate zones, and the network selects the branches in light of the notification from the mobile station,

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46. A method according to claim 42, wherein the network transmits a message, including a request to establish the branches, to the mobile station and commences the diversity handover for communicating with the mobile station.

47. A mobile station characterized in that it establishes a plurality of branches between the network and the mobile station upon the reception of a message from the network when no access link is established between the network and the mobile station, the message including a request for establishing the branches, thereby
5 commencing the diversity handover using the plurality of branches.

48. A mobile station according to claim 47, wherein if the request instructs to establish the branches between the mobile station and a single base station, the mobile station establishes the requested branches between the mobile station and the single
10 base station, thereby commencing intra-cell diversity handover.

49. A mobile station according to claim 47, wherein if the request instructs to establish the branches between the mobile station and a plurality of base stations, the mobile station establishes the requested branches between the mobile station and the
15 base stations, thereby commencing inter-cell diversity handover.

50. A base station controller characterized in that it establishes a plurality of branches between a network and a mobile station upon a call attempt to or from the mobile station at a location where the mobile station can communicate using diversity
20 handover, the plurality of branches including a main branch and at least one auxiliary branch for additional use in order that the mobile station may communicate using diversity handover.

51. A base station controller characterized in that it transmits a message to both
25 of a base station and a mobile station upon a call attempt to or from the mobile station at a location where the mobile station can communicate by means of intra-cell diversity handover wherein the mobile station and the base station communicate with each other using a plurality of branches, the message including a request for

1. The first step is to identify the problem or goal. This involves understanding the current situation, identifying the key issues, and determining the desired outcome.

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59. A base station controller characterized in that it transmits an instruction to a plurality of base stations and a message to a mobile station when a branch replacement is necessary for the mobile station and when it is recognized that the mobile station can commence communicating by means of inter-cell diversity handover
5 if the branch replacement is carried out, the instruction instructing the base stations to set branches necessary for the diversity handover, the message including an instruction to carry out the branch replacement and an instruction to add at least one auxiliary branch for additional use in order to communicate using diversity handover.

10 60. A base station characterized in that it replaces a branch for a mobile station and adds at least one auxiliary branch for the mobile station according to instructions of a message once the base station receives the message from a base station controller, the message including an instruction to carry out branch replacement and an instruction to add at least one auxiliary branch for additional use in order to
15 communicate using diversity handover, thereby commencing the intra-cell diversity handover.

61. A branch controlling method for a mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while
20 the mobile station treats an existent call, at least either of branch structures for both of the calls or at least either of communication frequency bands for both of the calls is controlled, so that the branch structures are the same as each other and the communication frequency bands are the same as each other.

25 62. A branch controlling method for a mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call, the a branch structure and a communication frequency band, being the same as those for the existent call, are assigned to the new

call.

63. A mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an
5 existent call, the mobile station uses a branch structure and a communication frequency band, being the same as those for the existent call, for the new call in accordance with an instruction from a network.

64. A base station controller adapted for a mobile station capable of treating a
10 plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call, the base station controller controls at least either of branch structures for both of the calls or at least either of communication frequency bands for both of the calls, so that the branch structures are the same as each other and the communication frequency bands are the same as each other.

15 65. A base station controller adapted for a mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call, the base station controller assigns a branch structure and a communication frequency band, being the same as that for the existent
20 call, to the new call.

66. A branch controlling method adapted for a mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call and when it is impossible to assign a branch
25 structure or a communication frequency band, being the same as the branch structure or the communication frequency band for the existent call, to the new call, another branch structure or another communication frequency band which can continue both of the existent and new calls is selected, and the selected branch structure or

communication frequency band is assigned to both of the existent and new calls.

67. A method according to claim 61, wherein the existent call is assigned to diversity handover branches and the new call is also assigned to the same diversity handover branches if possible.

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68. A mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call and when it is impossible to assign a branch structure or a communication frequency band, being the same as the branch structure or the communication frequency band for the existent call, to the new call, the mobile station assigns another branch structure or another communication frequency band, which can continue both of the existent and new calls, to both of the existent and new calls in accordance with an instruction from a network.

69. A base station controller adapted for a mobile station capable of treating a plurality of calls simultaneously, characterized in that when a new call occurs while the mobile station treats an existent call and when it is impossible to assign a branch structure or a communication frequency band, being the same as the branch structure or the communication frequency band for the existent call, to the new call, the base station controller selects another branch structure or another communication frequency band which can continue both of the existent and new calls, and assigns the selected branch structure or communication frequency band to both of the existent and new calls.

70. A branch controlling method adapted for a mobile station, characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls, a branch structure or a communication frequency band which can continue all of the calls is selected, and the selected branch structure or

communication frequency band is assigned to all of the calls commonly.

71. A mobile station capable of treating a plurality of calls simultaneously, characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls, the mobile station, according to an instruction from a network, alters a branch structure or a communication frequency band for all of the calls to a new branch structure or a new communication frequency band for all of the calls commonly.
72. A base station controller adapted for a mobile station, characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls, the base station controller selects a branch structure or a communication frequency band which can continue all of the calls, and assigns the selected branch structure or communication frequency band to all of the calls commonly.
73. A branch controlling method adapted for a mobile station, characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls and when there is not a branch structure which can continue all of the calls in relation to the mobile station or when there is not a communication frequency band which can continue all of the calls in relation to the mobile station, another branch structure or another communication frequency band which can continue a plurality of calls being high in priority among the calls are selected; the other call or calls are released; and the selected branch structure and communication frequency band are assigned to the priority calls.
74. A mobile station characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls and when there is not a branch structure which can continue all of the calls in relation to the mobile station or when

there is not a communication frequency band which can continue all of the calls in relation to the mobile station, the mobile station, according to an instruction from a network, releases a call or calls being low in priority; and assigns a branch structure and a communication frequency band selected by the network to a plurality of calls
5 being high in priority.

~~75.~~ A base station controller adapted for a mobile station, characterized in that when a trigger of handover occurs to the mobile station which is treating a plurality of calls and when there is not a branch structure which can continue all of the calls in
10 relation to the mobile station or there is not a communication frequency band which can continue all of the calls in relation to the mobile station, the base station controller selects another branch structure and another communication frequency band which can continue a plurality of calls being high in priority among the calls; releases the other call or calls; and assigns the selected branch structure and communication
15 frequency band to the priority calls.

~~76.~~ A method for establishing a control channel in a mobile communication system wherein a mobile station treats a plurality of calls using a plurality of sets of wireless communication resources, characterized in that a single control channel is established
20 between the mobile station and a network for transporting control information therebetween in a manner that the control channel is formed by one of the sets of wireless communication resources which are being used for a plurality of calls by the mobile station.

~~77.~~ A method for controlling to replace a control channel, characterized in that while a mobile station treats a plurality of calls using a plurality of sets of wireless communication resources and transmits or receives control information to or from a network via a single control channel formed by one of the sets of the wireless
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communication resources, and when a first call using the control channel formed by one of the sets of the wireless communication resources should be released and a second call should be continued, the control channel, which is formed by one of the sets of the wireless communication resources and should be released, is replaced with a new control channel formed by another set of the wireless communication resources, thereby continuing to control the second call.

78. A base station controller, characterized in that while a mobile station treats a plurality of calls using a plurality of sets of wireless communication resources and transmits or receives control information to or from a network via a control channel formed by one of the sets of the wireless communication resources, and when a first call using the control channel formed by one of the sets of the wireless communication resources should be released and a second call should be continued, the controller replaces the control channel, which is formed by one of the sets of the wireless communication resources and should be released, to a new control channel formed by another set of the wireless communication resources, thereby continuing to control the second call.

79. A method for determining a radio zone and an uplink transmission power, characterized in that

each of base stations transmits broadcast information indicating a perch channel transmission power level and an uplink interference level via a corresponding perch channel; and

a mobile station receives the broadcast information from near base stations around the mobile station;

detects respective reception levels of the perch channels for the near base stations;

calculates respective path losses between the mobile station and respective

calculates respective necessary uplink transmission power levels between the mobile station and respective near base stations on the basis of the calculated respective path losses, the respective uplink interference levels within the broadcast information, and required signal-to-interference ratios involved in reception by the near base stations;

controls an uplink transmission power in the selected radio zone based on the necessary uplink transmission power level of the selected radio zone.

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80. A base station comprising means for transmitting broadcast information indicating a perch channel transmission power level and an uplink interference level via a perch channel.

20 ~~81.~~ A mobile station characterized in that it
receives broadcast information from near base stations around the mobile
station via respective perch channels, the broadcast information from each of the near
base stations indicating a perch channel transmission power level and an uplink
interference level;

25 detects respective reception levels of the perch channels for the near base
stations;

calculates respective path losses between the mobile station and respective near base stations on the basis of the respective reception levels and the respective

1. *Chlorophyll a* (Chl *a*)
 2. *Chlorophyll b* (Chl *b*)
 3. *Chlorophyll c* (Chl *c*)
 4. *Chlorophyll d* (Chl *d*)
 5. *Chlorophyll e* (Chl *e*)
 6. *Chlorophyll f* (Chl *f*)
 7. *Chlorophyll g* (Chl *g*)
 8. *Chlorophyll h* (Chl *h*)
 9. *Chlorophyll i* (Chl *i*)
 10. *Chlorophyll j* (Chl *j*)
 11. *Chlorophyll k* (Chl *k*)
 12. *Chlorophyll l* (Chl *l*)
 13. *Chlorophyll m* (Chl *m*)
 14. *Chlorophyll n* (Chl *n*)
 15. *Chlorophyll o* (Chl *o*)
 16. *Chlorophyll p* (Chl *p*)
 17. *Chlorophyll q* (Chl *q*)
 18. *Chlorophyll r* (Chl *r*)
 19. *Chlorophyll s* (Chl *s*)
 20. *Chlorophyll t* (Chl *t*)
 21. *Chlorophyll u* (Chl *u*)
 22. *Chlorophyll v* (Chl *v*)
 23. *Chlorophyll w* (Chl *w*)
 24. *Chlorophyll x* (Chl *x*)
 25. *Chlorophyll y* (Chl *y*)
 26. *Chlorophyll z* (Chl *z*)
 27. *Chlorophyll aa* (Chl *aa*)
 28. *Chlorophyll ab* (Chl *ab*)
 29. *Chlorophyll ac* (Chl *ac*)
 30. *Chlorophyll ad* (Chl *ad*)
 31. *Chlorophyll ae* (Chl *ae*)
 32. *Chlorophyll af* (Chl *af*)
 33. *Chlorophyll ag* (Chl *ag*)
 34. *Chlorophyll ah* (Chl *ah*)
 35. *Chlorophyll ai* (Chl *ai*)
 36. *Chlorophyll aj* (Chl *aj*)
 37. *Chlorophyll ak* (Chl *ak*)
 38. *Chlorophyll al* (Chl *al*)
 39. *Chlorophyll am* (Chl *am*)
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 41. *Chlorophyll ao* (Chl *ao*)
 42. *Chlorophyll ap* (Chl *ap*)
 43. *Chlorophyll aq* (Chl *aq*)
 44. *Chlorophyll ar* (Chl *ar*)
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 47. *Chlorophyll au* (Chl *au*)
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 49. *Chlorophyll aw* (Chl *aw*)
 50. *Chlorophyll ax* (Chl *ax*)
 51. *Chlorophyll ay* (Chl *ay*)
 52. *Chlorophyll az* (Chl *az*)
 53. *Chlorophyll ba* (Chl *ba*)
 54. *Chlorophyll bb* (Chl *bb*)
 55. *Chlorophyll bc* (Chl *bc*)
 56. *Chlorophyll bd* (Chl *bd*)
 57. *Chlorophyll be* (Chl *be*)
 58. *Chlorophyll bf* (Chl *bf*)
 59. *Chlorophyll bg* (Chl *bg*)
 60. *Chlorophyll bh* (Chl *bh*)
 61. *Chlorophyll bi* (Chl *bi*)
 62. *Chlorophyll bj* (Chl *bj*)
 63. *Chlorophyll bk* (Chl *bk*)
 64. *Chlorophyll bl* (Chl *bl*)
 65. *Chlorophyll bm* (Chl *bm*)
 66. *Chlorophyll bn* (Chl *bn*)
 67. *Chlorophyll bo* (Chl *bo*)
 68. *Chlorophyll bp* (Chl *bp*)
 69. *Chlorophyll bq* (Chl *bq*)
 70. *Chlorophyll br* (Chl *br*)
 71. *Chlorophyll bs* (Chl *bs*)
 72. *Chlorophyll bt* (Chl *bt*)
 73. *Chlorophyll bu* (Chl *bu*)
 74. *Chlorophyll bv* (Chl *bv*)
 75. *Chlorophyll bw* (Chl *bw*)
 76. *Chlorophyll bx* (Chl *bx*)
 77. *Chlorophyll by* (Chl *by*)
 78. *Chlorophyll bz* (Chl *bz*)
 79. *Chlorophyll ca* (Chl *ca*)
 80. *Chlorophyll cb* (Chl *cb*)
 81. *Chlorophyll cc* (Chl *cc*)
 82. *Chlorophyll cd* (Chl *cd*)
 83. *Chlorophyll ce* (Chl *ce*)
 84. *Chlorophyll cf* (Chl *cf*)
 85. *Chlorophyll cg* (Chl *cg*)
 86. *Chlorophyll ch* (Chl *ch*)
 87. *Chlorophyll ci* (Chl *ci*)
 88. *Chlorophyll cj* (Chl *cj*)
 89. *Chlorophyll ck* (Chl *ck*)
 90. *Chlorophyll cl* (Chl *cl*)
 91. *Chlorophyll cm* (Chl *cm*)
 92. *Chlorophyll cn* (Chl *cn*)
 93. *Chlorophyll co* (Chl *co*)
 94. *Chlorophyll cp* (Chl *cp*)
 95. *Chlorophyll cq* (Chl *cq*)
 96. *Chlorophyll cr* (Chl *cr*)
 97. *Chlorophyll cs* (Chl *cs*)
 98. *Chlorophyll ct* (Chl *ct*)
 99. *Chlorophyll cu* (Chl *cu*)
 100. *Chlorophyll cv* (Chl *cv*)
 101. *Chlorophyll cw* (Chl *cw*)
 102. *Chlorophyll cx* (Chl *cx*)
 103. *Chlorophyll cy* (Chl *cy*)
 104. *Chlorophyll cz* (Chl *cz*)
 105. *Chlorophyll da* (Chl *da*)
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 107. *Chlorophyll dc* (Chl *dc*)
 108. *Chlorophyll dd* (Chl *dd*)
 109. *Chlorophyll de* (Chl *de*)
 110. *Chlorophyll df* (Chl *df*)
 111. *Chlorophyll dg* (Chl *dg*)
 112. *Chlorophyll dh* (Chl *dh*)
 113. *Chlorophyll di* (Chl *di*)
 114. *Chlorophyll dj* (Chl *dj*)
 115. *Chlorophyll dk* (Chl *dk*)
 116. *Chlorophyll dl* (Chl *dl*)
 117. *Chlorophyll dm* (Chl *dm*)
 118. *Chlorophyll dn* (Chl *dn*)
 119. *Chlorophyll do* (Chl *do*)
 120. *Chlorophyll dp* (Chl *dp*)
 121. *Chlorophyll dq* (Chl *dq*)
 122. *Chlorophyll dr* (Chl *dr*)
 123. *Chlorophyll ds* (Chl *ds*)
 124. *Chlorophyll dt* (Chl *dt*)
 125. *Chlorophyll du* (Chl *du*)
 126. *Chlorophyll dv* (Chl *dv*)
 127. *Chlorophyll dw* (Chl *dw*)
 128. *Chlorophyll dx* (Chl *dx*)
 129. *Chlorophyll dy* (Chl *dy*)
 130. *Chlorophyll dz* (Chl *dz*)
 131. *Chlorophyll ea* (Chl *ea*)
 132. *Chlorophyll eb* (Chl *eb*)
 133. *Chlorophyll ec* (Chl *ec*)
 134. *Chlorophyll ed* (Chl *ed*)
 135. *Chlorophyll ee* (Chl *ee*)
 136. *Chlorophyll ef* (Chl *ef*)
 1

perch channel transmission power levels within the broadcast information;

calculates respective necessary uplink transmission power levels between the mobile station and respective near base stations on the basis of the calculated respective path losses, the respective uplink interference levels within the broadcast
5 information, and respective signal-to-interference ratios involved in reception by the respective near base stations;

selects a radio zone of which the necessary uplink transmission power level is minimum among the respective necessary uplink transmission power levels, the base station of the selected radio zone being ready for communication with the mobile
10 station or being able to commence communication with the mobile station after handover; and

controls an uplink transmission power in the selected radio zone based on the necessary uplink transmission power level of the selected radio zone.

82. A handover controlling method for additionally establishing a handover
15 branch between a mobile station and a network, characterized in that a procedure for additional establishment of a branch is completed with a state transition to which the mobile station can commence communicating without waiting for a confirmation of synchronization for all branches.

20

83. A handover controlling method according to claim 82, wherein the procedure for additional branch establishment is completed with confirmation of synchronization for one branch among the branches established for the mobile station.

84. A mobile station characterized in that if the mobile station has received a
25 request from a network to establish a new additional branch between the network and the mobile station, the mobile station establishes the new branch and then starts diversity reception upon reception of a signal through the new branch.

85. A base station characterized in that if the base station has received a request from a base station controller to establish a new additional branch between a mobile station and the base station for carrying out intra-cell diversity handover, the base station additionally establishes the new branch and then starts intra-cell diversity reception upon reception of a signal through the new branch.

86. A base station characterized in that if the base station has received a request from a base station controller to establish a new additional branch between a mobile station and the base station for carrying out inter-cell diversity handover, the base station establishes the new branch and then starts sending the received signals to the base station controller that executes inter-cell diversity reception upon reception of a signal through the new branch.

87. A base station controller characterized in that when the base station controller establishes a new additional branch between a mobile station and a network, the base station controller provides a request for establishing the new branch and then completes a procedure for additional establishment of the new branch without a confirmation of synchronization for all branches between the mobile station and the network.

88. A base station controller according to claim 87, wherein the base station controller provides the request for establishing the new branch being necessary for inter-cell diversity handover, and then starts inter-cell diversity reception upon reception of signals through the branches being necessary for inter-cell diversity handover.

89. A radio mobile communication system wherein a plurality of channels can be

established on a single carrier frequency by code division multiplex access, characterized in that the system comprises code-resource-assigning means for assigning at least a part of an assignable code resource to one of the channels in accordance with a transmission rate necessary for the corresponding channel, the part
5 corresponding to a certain bandwidth corresponding to the transmission rate.

90. A radio mobile communication system according to claim 89, further comprising channel-assigning means for assigning one of the channels, to which a part of the assignable code resource is assigned, to a mobile station in accordance with a
10 transmission rate necessary for the mobile station.

91. A radio mobile communication system wherein a plurality of channels can be established on a single carrier frequency by code division multiplex access, characterized in that the system comprises a plurality of assignable code resources,
15 each of code resources corresponding to a certain bandwidth and being independent of the other code resources; and reassigning means for reassigning a part of an assignable code resource to one of the channels to which a part of another assignable code resource is already assigned if there is not an unused code resource corresponding to a bandwidth suitable for a necessary transmission rate when assigning an unused
20 assignable code resource to one of the channels in accordance with the necessary transmission rate.

92. A radio mobile communication system according to claim 91, further comprising unused-code-resource determining means for determining if there is an
25 unused code resource having a code resource length suitable for a necessary transmission rate or not when assigning an unused assignable code resource to one of the channels in accordance with the necessary transmission rate necessary.

93. A radio mobile communication system according to claim 91, wherein at least one standard code resource corresponding to a predetermined bandwidth is preselected and the system comprises assignment-possibility-determining means for determining at predetermined moments if there is at least one unused standard code resource or
5 not, the reassigning means reassigning a part of an assignable code resource to one of the channels to which a part of another assignable code resource is already assigned until an unused standard code resource is reserved if the determination result by the assignment-possibility-determining means has been negative.

10 ~~94.~~ A radio base station for which a plurality of channels can be established on a single carrier frequency by code division multiplex access, characterized in that it comprises code-resource-assignment-possibility-determining means for determining whether or not it is possible to assign at least a part of an assignable code resource to one of channels in accordance with a transmission rate necessary for the corresponding
15 channel, the part corresponding to a certain bandwidth corresponding to the transmission rate.

95. A base station controller for controlling the radio base station according to claim 94, further comprising channel-assigning means for assigning a channel, to
20 which a part of assignable code resource is assigned, to a mobile station in accordance with a transmission rate necessary for the mobile station.

96. A method for controlling a radio mobile communication system wherein a plurality of channels can be established on a single carrier frequency by code division
25 multiplex access, characterized in that the method comprises code-resource-assigning step for assigning at least a part of an assignable code resource to one of the channels in accordance with a transmission rate necessary for the corresponding channel, the part corresponding to a certain bandwidth corresponding to the transmission rate.

97. A method for controlling a radio mobile communication system including a plurality of assignable code resources, each of code resources corresponding to a certain bandwidth and being independent of the other code resources, a plurality of
5 channels being capable of being established on a single carrier frequency by code division multiplex access, characterized in that in order to assign an unused assignable code resource to one of the channels in accordance with a necessary transmission rate, the method comprises the steps of

determining whether or not there is an unused code resource having a code
10 resource length in accordance with the necessary transmission rate; and

reassigning a part of an assignable code resource to one of the channels to which a part of another assignable code resource is already assigned if the determination indicates that there is not an unused code resource having a bandwidth
suitable for the necessary transmission rate.

15

98. A method for controlling radio base station for which a plurality of channels can be established on a single carrier frequency by code division multiplex access, characterized in that it comprises a code-resource-assignment-possibility-determining step for determining whether or not it is possible to assign at least a part of an
20 assignable code resource to one of channels in accordance with a transmission rate necessary for the corresponding channel, the part corresponding to a certain bandwidth corresponding to the transmission rate.

99. A method for controlling a radio base station according to claim 94, comprising
25 a channel-assigning step for assigning a channel, to which a part of an assignable code resource is assigned to a mobile station in accordance with a transmission rate necessary for the mobile station.